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MEDICAMENTS.

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MEDICAMENTS.

After considering many subjects fitting to be brought before this Association, we selected the above as one permitting us to group a few random thoughts, serving perhaps to provoke discussion, from which may come something of value.

Comparing the complex pharmacy of today, with its alkaloids, glucosides, neutral principles and synthetic compounds; its coated pills, lozenges, tablets, triturate tablets, capsules and cachets with that of the near past, manipulating the crude material into infusions, decoctions, tinctures, powders and pills, we are sometimes led to call a halt and ask if scientific medication is any nearer, and inquire if disease is held more in abeyance by this great array of rare and expensive remedies.

As pharmacists we may not be able to discuss why quinine at twenty-five cents an ounce cannot do all the work it performed when two dollars an ounce, nor why it is replaced by a patented product, antipyrin, of five times the present cost of the alkaloid.

We cannot tell why antifebrin at four dollars a pound should have a different action from the same chemical product called acetanilid, costing one dollar a pound.

We can only press forward in the rush, and secure as early as possible the new medical novelty, that the commercial enterprise of the manufacturer provides, and the bitterness of human distress, with the eagerness of the physician to employ every adjunct to power of relief, creates a demand for.

The question is often asked, "Is not the manufacturer with his pseudo proprietary or patent remedies an unmitigated evil?"

The physician, distressed by the demand upon his time for the consideration of the claims of legions of new remedies:—chagrined by learning that he has been giving chlorides and sulphates and attributing their effects to phosphates:—mortified at being misled into prescribing nostrums that in composition bear no relation to their schedule of contents, declares war.

The pharmacist, annoyed at being forced to invest his capital at a loss, purchasing an original package for a single demand, or adding to his stock the tenth novelty or synthetic of similar intention and untried value, into which enters none of his learning, originality, or skill, becomes disgusted.

Both appear to be planning a "Coup de main" when the actual merit of some such compound and the great and permanent good it performs opens up a new era of tolerance.

Will it ever be possible to establish a joint commission of physicians and pharmacists to examine and report upon these products?

Each remedy to be investigated, and, as far as chemistry can determine it, first be proven to be true to name and assumed composition, then to be tested for therapeutic value by those perfectly capable of giving it its right estimate.

The blame of blind medication by physicians, the needless use of improper remedies, and faulty self-treatment by an uneducated public, is chargable to physicians and pharmacists alike.

The one prescribes and teaches the public to call for the remedies and the other too often recommends them. Ignoring this class of medicaments is it possible to secure anything like uniformity in medi-

cation? Has there been a decided advance in this direction? Each new class of preparations is supposed to further progress. How far this may be true let us consider.

Formerly great divergence was caused by the lack of a national standard, but now that we have one of the best pharmacopoeias extant do we have constancy in composition and activity of remedies? Unfortunately many physicians and some pharmacists ignore the pharmacopoeia and govern their course by a dispensatory that may or may not antedate the standard, and is not intelligently compared with it.

Again, the great variation in crude material, and the modification by manipulatation prevent uniformity.

The class of fluid extracts was supposed to supply uniform, concentrated solutions, permitting small dosage, with less alcohol interference than tinctures, and free from the ferment changes of infusions and decoctions.

Assuming that the menstruum was alike for the same drug, faulty storage in too damp or too dry a situation might alter the strength of the drug from 10 to 40 per cent, by variation in moisture alone. This moisture diluting the alcoholic solvent affects its power of solution. By variation of 20°F. in temperature at time of percolation, 25 per cent difference in strength may occur. In addition to this, note the facts that the call has been urgent to modify menstrua so that the fluid extract may be used for making tinctures and syrups, and you perceive that many of this class are not fluid extracts in any accepted sense of the term.

The use of this class for making infusions and decoctions is of course a radical departure from right practice in nearly all cases. Water dissolves gums, sugar, extractivess, etc., that are largely rejected by alcoholic menstrua, while the latter dissolve volatile oil and resin combinations, tannin combinations, alkaloids, etc., that are insoluble in water and preclude the miscibility of such fluid extracts with aqueous vehicles.

Competition and storing to complete precipitation have further modified strength in drug and menstrua, until physicians testify that they find one pharmacist's tincture as strong as another's fluid extract and that tinctures, infusions and decoctions are often nearly valueless.

To illustrate this point we present five samples of Fl. Ext. Belladonna. The official is made from the root with alcohol of 91 per cent weight strength as menstruum. It averages to contain 8 per cent of extractive and 83.7 per cent alcohol by weight. No. 1, Ext. 5.6 per cent. Alc. 87.12 per cent; No. 2, Ext., 7 per cent. Alc. 83.62 per cent; No. 3, Ext., 16 per cent. Alc. 57.12 per cent. No. 4, Ext., 16.3 per cent; Alc.. 48.7 per cent. No. 5, Ext., 15 per cent; Alc., 47.8 per cent.

(Examined by E. E. Bickford, Ph. G., Mass. Col. of Pharm.)

You will observe that those containing least alcohol are densest and and darkest in color. This is due to excess of water and solution of more extractive and coloring matter. Should a prescription be written calling for this fluid extract and camphor or other volatile oil, as in the official Lin. Belladonnæ, these fluid extracts will not dissolve them.

We also show five samples of Fl. Ext. of Aromatic Powder. No. 1, Ext., 10 per cent; Alc., 60.6 per cent. No. 2, Repercolation, Ext., 10 per cent; Alc., 61 per cent. No. 3, Ext., 7.7 per cent; Alc. 64 per cent. No. 4, Ext., 6.1 per cent; Alc., 54 per cent. No. 5, Ext., 2.3 per cent; Alc., 45 per cent.

Physical inspection of these samples shows their great variation.

To show the the character of infusions and decoctions made from standard fluid extracts, we present Inf. Buchu, Infus. Capsici, Infus. Pruni Virg., Dec. Cinchonæ Flavæ and Dec. Uvæ Ursi.

Observe their unsightly appearance and note that filtration removes much of their activity.

This line of illustrations might be extended to great length but these presented should be sufficient.

MEDICATION BY PILLS.

A pill should be a mass of medicinal matter spherical or ovoid in form, of such consistence as to maintain its shape and yet be readily soluble or disintegrated in the fluids of the stomach.

If properly made, no doubt a fresh pill is always better than an old one. It is not in our province to tell what the physician shall order in pill form, but it is a great pity that more discrimination is not used in this direction and it may in some cases be better for the patient that the pill is old and does not act. The superiority of finish and greater palateableness of coated pills and the delay incident to waiting for freshly made pills has opened the way to the introduction those of manufacturers. We are not prepared to say that this is against uniformity. If you examine the thirty samples of pills put up extemporaneously, you will find a wonderful variation in the products obtained by the same prescriptions.

If you compare the thirty specimens from the manufacturers, you find a great range of style.

Note the Citrate of Iron and Quinine Pills, green, red and black. The official salt is red.

Note the A. S. & B. pills. Mostly black. The mass in greenish, but the Doctor says the black pill is more active and so the patient must have a painted pill. Note the yellow quinine pills. This is simply due to age. Quinine, Cinchonidine and many other masses change in this way.

Note the five kinds of Blaud's pills.

The common formula calls for equal weights of ferrous sulphate and potassic carbonate. This gives a large excess of potassic carbonate and an alkaline pill. Such pills gelatine coated, the coating dulls. Note then this glossy pill with a mass nearly neutral, practically Vallet's mass with potassic sulphate added. Notice this beautiful pill, type of a line of "*gelatine coated*" (?) goods; "*without pinhole.*" An hour of maceration in water does not expand any gelatine or act upon the pill. Cutting with the pen-knife reveals a *sugar coating.* Alcohol removes its glossy coating of *resinous matter.* Note how readily the iodide of iron pills decompose.

Yet, despite the fact that the call for style and durability has led to the introduction of wonderful "*improvements*"(?) in pill making, it is doubtless true that manufactured pills average being nearer to their assumed composition than will the same number and variety obtained at the dispensing counter.

TABLET MEDICATION.

As a supposed advance upon pills, compressed tablets were introduced. The general claims were,—"made from dry powder, without excipient and much more soluble than coated or old stock pills."

These claims are in a measure fallacious.

Crystalline salts can often be compressed without the addition of foreign matter, but powdered drugs and such chemical products as sodium salicylate. reduced iron, quinine sulphate, etc., must be moistened with some excipient, granulated and dried, before compression.

To prevent the adhesion of many of these masses to the dies, some agent must be employed for lubrication and this diminishes the solubility.

Brief consideration will show that a compressed tablet offering much less surface to the action of the solvent than does the original material in powder form, will always be less soluble.

If the reverse occurs the tablet cannot be true to its label. To illustrate. We have some Quinine Bisulphate, some tablets of the same made by compression without any addition, and samples of commercial products.

You observe that the salt dissolves by much agitation in the quantity of water used; the correct tablet much slower, but, presto, the commercial tablet falls apart and dissolves quicker than the original salt. The bubbles of gas evolved during this change hint at the character of this "improvement."

Note how quickly this sodium salicylate dissolves. Observe the difficulty in dissolving the tablets. Press the tablets between the fingers and note the greasy feeling. Assay and find .003 of grease in each tablet. This gives them a fine finish and tends to prevent change, and the fact that thousands of pounds are prescribed may show that their slow solubility does not impair their physiological action.

The physician wants a tasteless tablet. Note how it is arrived at in the Quinine and Chocolate tablets before you. The sweetest, most delicious, can be taken ad libitum. One physician personally used the greater part of an entire package without action.

Note the variation in these Alkaline Antiseptic Tablets. All have the same formula, Note that some make a practically clear solution. Yet if the quantity of eucalyptol, thymol and menthol claimed, was in each tablet, it would be physically impossible. But the physician may reject the stronger tablet, true to its label, and give preference to the weaker, fancying the manufacturer has some slight of hand to overcome natural law and take his rivals at disadvantage.

Yet this form of medication has presented to the physician many valuable remedies in convenient form. It is only necessary to call attention to these peculiarities of method that you may intelligently give each its due measure of merit.

TRITURATE TABLETS.

The suggestion of Dr. Fuller that active medicinal agents be thoroughly triturated with milk sugar, the mass dampened and formed into tablets by pressing in hard-rubber molds, furnishing a friable, readily soluble product of accurate dosage, has met with the approval of many physicians.

For hypodermic use and for the great majority of remedies that can be administered in small dose, this form is undoubtedly an advance over the pill or compressed tablet triturate.

If the minimum amount of moisture is used, the change incident to molding and drying is very slight. It is a misfortune however that many agents are ordered in this form that are not at all adapted to it; as large doses of solid extracts, and salts that suffer decomposition when mixed and moistened.

CAPSULES.

Gelatine capsules have been recommended as furnishing a means of administering nauseous remedies in condition ready for rapid assimilation.

The intention is sometimes interfered with by the druggist first forming a pill mass of the material and placing this in the capsule, instead of using the dry powder. The moisture of such a mass if excessive may soften the capsule, consequently a hard mass is often used.

We have found great variation in the size of capsule employed for the same prescription, and failure to instruct the patient as to the character of the container, has brought about some very amusing episodes.

WAFERS AND CACHETS.

The wafer, a disk of flour and gum, is well adapted for use in administering disagreeable powders. A common difficulty in using them consists in moistening too much before folding, producing a soft unsightly mass. The seal or cachet, a special form of wafer, is preferable. The edges only are moistened and two sealed together with the

powder between. We believe an improvement over the present hard pills would be the furnishing of these cachets in shape and size to take pill mass of rather soft consistence, but not soft enough to impair the cachet.

ELIXIRS.

This class of medicaments has come to stay. It is a radical departure from the theory of medication by small dosage, using active fluid extracts, resin, resinoids, alkaloids, etc. These pleasantly flavored, mildly alcoholic solutions, seem to be popular in proportion as they are agreeable in taste, and to meet this requirement they are sometimes divested of much medicinal activity.

One illustration, the examination of eight samples of Elixir of Three Phosphates, will suffice.

RESULTS OF ASSAYS.

No. 1.	Quinine as Sulphate, in each fluidram,						.730	grain.	Strychnine	.017	grain.
" 2.	"	"	"	"	"	"	.069	"	"	.015	"
" 3.	"	"	"	"	"	"	.180	"	"	.013	"
" 4.	"	"	"	"	"	"	.425	"	"	.018	"
" 5.	"	"	"	"	"	"	.384	"	"	.016	"
" 6.	"	"	"	"	"	"	1.000	"	"	.017	"
" 7.	"	"	"	"	"	"	.98	"	"	.016	"
" 8.	"	"	"	"	"	"	1.00	"	"	.0165	"

The last two contained chloride of iron instead of phosphate or pyrophosphate. This innovation was undoubtedly made to furnish a permanent elixir miscible with water. The others, made with phosphate and pyrophosphate of iron, inevitably grow dark and form a cloudy solution when mixed with water.

We present five samples of so called Elixir of Three Phosphates, and five of Elixir Gentian with Tincture Chloride of Iron.

This running fire on preparations serves to show the variation in medication arising from manipulation alone. Add to this the variation in crude material and we see that accurate and uniform, medication is far away in the future. Yet there is a cry from the Egypt of dimness for more light through the window of standardization.

Can this be practically arrived at?

We claim that no ordinary chemist, well versed in the theory and practice of analysis, is capable of obtaining reliable results with most assay processes now in use, without much previous practice with each method. Much less can the pharmacist, constantly interrupted by the other demands of his calling, perfect himself in many processes of assay. The errors arising from false standards so obtained would introduce an element of danger more serious than any yet mentioned. We take at random results obtained by different workers on the same samples of drugs, each assayer having quite the average ability and better than ordinary facilities for doing the work.

We might extend this illustration through many assays, but scrutiny of this brief table will disclose the point aimed at.

	Drug.	Alkaloid. %	Drug.	Free Cantharidin. %		Morphine. %		Morphine. %
No. 1.	Bell Leaf.	.6	Cantharides	.630	Po. Opium	15.48	Laudanum	15.
" 2.	"	.64	"	.680	"	15.42	"	15.2
" 3.	"	.48	"	.700	"	12.00	"	13.5
" 4.	"	.43	"	.430	"	11.5	"	9.
" 5.	"	.04	"	.220	"	9.	"	13.
" 6.	"	.064	"	.415	"	13.5	"	14.
" 7.	"	.024	"	.840	"	12.5	"	11.
" 8.	"	.038	"	.615	"	10.75	"	13 3
" 9.	"	.24	"	.328	"	11.25	"	12.
" 10.	"	.58	"	.425	"	16.	"	14.

All processes involved gravimetric estimations.

We also give the percentage of activity in eight important drugs, as stated by five manufacturers and by five text books. Different processes are used by the different assayers.

DRUG.		MANUFACTURERS. Grav. Assay.				
Nux Vomica.....	Strychnine.....	.9 —2.5	1.5 vol. mixed	1.5 vol. mixed	2.1 vol. mixed	Extractive
	Brucine, &c.....	.5 —2.2				
Ignatia.....	do.	2. —2.2	.....	.....	1. ext.	1. ext.
		.7 —1.2	.....	.....	.....	.....
Bell. Root.....	Atropine.....	.45— .58	.5 vol.	.5 grav.	.62 vol.	.5?
Bell. Leaves....	do.	.4 — .64	.....	.4 grav.	.62 vol.	.4?
Hyoscy. Leaves.	Hyoscyamine, &c..	.16— .22	.18 grav.	.18 vol.	.4 vol.	.15?
Stramon. Seed...	Daturine, &c.....	.28— .36	.37 vol.	.35 grav.	.4 vol.	.3?
Kola Nut.....	Caffeine.....	1.35	.....	.....	.....	.....
Guarana.....	do.	3. —4.5	.....	.....	.....	.....

DRUG.		TEXT BOOKS.				
Nux Vomica	Strychnine.....	1.6	1.26	.25— .5	.25— .5	.4 —1.
	Brucine &c.....	3.15	1.90	.12—1.	2.5 —3.	1. —1.5
Ignatia	do.	1.5	.....	1.5	.5 —1.5	1.2
		.5	.....	.5	.....	.4
Bell. Root.....	Atropine.....	.3 — .5	.47—1.5	.2 — .5	.15—1.	.25— .6
Bell. Leaves....	do	.3 — .5	.4 — .7	.83	.44	.44— .66
Hyoscy. Leaves.	Hyoscyamine, &c..	.1 — .5	.14— .28	.05	.04— .224	.....
Stramon. Seed...	Daturine, &c.....	.2 — .3	.33— .55	.1	.02	.....
Kola Nut.....	Caffeine.....	2.	.....	.....	2.13	2.13
Guarana.....	do.	4.	4. —6.5	.....	4.5	5.

Will it not be dangerous to fix a standard for these potent drugs, unless with it we have a law that they shall be assayed by experienced men in state employ, at the points of distribution? Otherwise we may be left to a variation of 1500 per cent an account of faulty assay!

If we have such assay and standard, the error in manipulation will be reduced to 50 per cent as a maximum.

But if we have absolutely standard remedies, can we have *uniform medication*? Shall we not continue to hear of idiocyncrasy of patient, faulty diagnosis and prognosis, causing miscarriage of intention and application of medicaments?

Is not a desirable line of advance that of better training of the medical student in the direction of practical materia-medica and pharmacy?

Is not the course of instruction in many medical colleges deficient in this respect?

Would not pharmacists be more intelligent coadjutors of physicians if the course of instruction in pharmacy colleges included more attention to therapeutics?

(Presented to the American Medical Association, at the meeting held at Washington D. C., May 5, 1891, by Edgar L. Patch, Boston. Delegate from the American Pharmaceutical Association).